

A NEW *PACHODYNERUS* FROM MAYAGUANA ISLAND, BAHAMAS,
AND A KEY TO THE WEST INDIAN SPECIES OF THE GENUS
(HYMENOPTERA: VESPIDAE: EUMENINAE)

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Abstract.—*Pachodynerus linda* n. sp. is described from Mayaguana I., Bahamas. Taxonomic, comparative and distributional notes, as well as a key, are provided for the 10 West Indian species of the genus. Lectotypes are designated for *Vespa atrata* Fabricius, *Vespa cinerascens* Fabricius, *Odynerus sanctivincenti* Ashmead, *Odynerus grenadensis* Ashmead, and *Odynerus cubensis* Saussure. *Pachodynerus scrupus* var. *bahamensis* Bequaert and Salt, is recognized as a subspecies of *cubensis* Saussure (new status). The generic name *Monobiella* Ashmead, is synonymized under *Pachodynerus* Saussure, 1875 (new synonymy).

In 1983 I had the opportunity to visit briefly Mayaguana, one of the southernmost islands in the Bahamas. It is located midway between Acklins I. and the Caicos Is. Mayaguana is about 26 miles long and 7 miles wide. Its maximum elevation is 110 feet, and the island is xeric and sandy. The area that I explored, the coast of Abraham Bay near Start Point, was covered by mixed scrubby vegetation including small trees and scattered palms. I collected in late afternoon from about 3 to 6 PM. The only wasp taken proved to be an undescribed species of *Pachodynerus*. The species is described now so that a name will be available to others currently working on the genus.

It is not my intention here to provide a comprehensive treatment of the West Indian species of *Pachodynerus*, but before describing the new species I had to familiarize myself with the Caribbean members of the genus, and it seems appropriate to record what I have learned. Bequaert (1948), in his review and key to the West Indian *Pachodynerus*, treated only seven species, but there are at least ten, including the new one. Therefore, I have provided a key to species and descriptive and taxonomic notes for each of them. Although I have examined material from Trinidad, I have not made an effort to elucidate all the species that may occur on this continental island. I have relied on Bequaert's (1948) and Zavattari's (1912) interpretations of most Caribbean names in *Pachodynerus*, but I did borrow type material of many of the oldest species, especially those not studied by these authors.

The insect fauna of the West Indies is still poorly known except for the larger islands and a few of the small islands commonly visited by vacationers. Many islands remain unsampled or inadequately sampled, at least for *Pachodynerus* and other wasps, and additional endemics such as the one described here may be

found on them. In particular, islands in the Caicos group and some of the southern islands in the Bahamas such as Acklins, Crooked, and Great Inagua, need to be surveyed. Other Bahamas islands that seem to have been ignored by collectors are Andros, Grand Bahama, Great Abaco and Great Exuma.

I thank Dr. Walter Adey, Department of Paleobiology, Smithsonian Institution, for taking me along on one of his trips to his reef project at Mayaguana. The discovery of this new wasp in one short afternoon begs for a return trip of longer duration! James Carpenter, Museum of Comparative Zoology, Harvard University, lent the type of *barbouri* and other material that was determined by Bequaert. He also read the manuscript and offered helpful advice. Ole Lomholdt, Zoologisk Museum, Copenhagen, Denmark, generously lent Fabricius' syntypes of *atratus* and *cinerascens*, Claude Besuchet, Muséum d'Histoire Naturelle, Geneva, lent the holotype of *tibialis*, and Mme. J. Casevitz Weulersee, Muséum National d'Histoire Naturelle, Paris, France, lent Saussure's syntypes of *cubensis*. Marjorie Favreau, American Museum of Natural History, New York; Michael Ivie, Montana State University, Bozeman; and Lionel Stange, Florida Department of Agriculture, Gainesville (FDA), lent their holdings of Caribbean *Pachodynerus*. Frank Kurczewski, State University of New York, Syracuse (SUNY), lent material from San Salvador I. that was reported upon by Elliott et al. (1979). Special thanks go to Rebecca Friedman for taking the SEM photograph, and to Don Anderson, Eric Grissell and Frank Parker for reviewing the manuscript.

Pachodynerus linda Menke, NEW SPECIES

Fig. 1

Description of female.—*Color*: Dull black except front face of pronotum, legs, and sternum II shiny; face including scape weakly shining; frons with yellow spot between antennal socket and eye margin; wings uniformly amber. *Vestiture*: Body generally covered by erect white setae whose length ranges from slightly less than to slightly more than 1 midocellus diameter; setae of terga I–II sparse, slightly decumbent. *Structure*: Margin of clypeal lobe slightly concave; clypeal surface shallowly punctate, punctures somewhat elongate vertically, not sharply defined, accompanied by feeble vertical rugae, punctures smaller, evanescent toward eye; frons densely, coarsely punctate, punctures deep, sharply rimmed, nearly contiguous but of irregular shape, a small impunctate area in front of midocellus and on outside of hindocellus, interocellar area flat; thorax slightly longer than wide (ratio: 44:40 or 43:38; length measured along midline from pronotal carina to hindmargin of metanotum; width measured across tegulae); pronotal dorsum densely, deeply, irregularly punctate, punctures subcontiguous, somewhat larger and deeper than those on scutum; scutum densely, deeply, somewhat irregularly punctate, punctures contiguous; scutellar punctation similar to pronotal dorsum; metanotum without obvious transverse crest, but when viewed in profile from in front, several teeth are visible between coarse, shallow, contiguous punctation; mesopleuron (except preomaulal area and area between midcoxa and scrobe) coarsely, closely irregularly punctate, punctures subcontiguous, flat bottomed, some large enough to be termed foveae; metapleuron smooth, dull, except for few weak ridges and punctures dorsad; propodeum with rounded posterolateral process that is directed posterad (Fig. 1), and a weak, interrupted carina between it



Fig. 1. Rear half of thorax and base of gaster of *Pachodynerus linda*.

and metanotum; dorsolateral area of propodeum foveolate, foveolation extending onto tooth and onto upper part of propodeal side as punctures: propodeal hindface dull, impunctate, with crescentic carinae near petiole socket, median carina of hindface dull; tergum I without transverse carina at crest of anterior vertical face, dorsum sparsely, very shallowly punctate, punctures 2 to 4 diameters apart, but becoming denser, deeper toward hind and lateral margins; punctures of II sparse, very shallow, almost imperceptible on disk, but becoming deeper, denser (1–2 diameters apart) laterally and apically; sternum II with rounded, transverse swelling near base, disk broadly shallowly concave, shiny, punctate, punctures somewhat open behind, 1 to 3 diameters apart. *Length*: 10.5–11 mm.

Male.—Unknown.

Types.—Holotype ♀ and four ♀ paratypes: Abraham Bay, Mayaguana I., Bahamas, April 24, 1983, A. S. Menke. Holotype and three paratypes deposited in the National Museum of Natural History. One paratype deposited in the Museum of Comparative Zoology, Harvard University, Cambridge.

Etymology.—*P. linda*, a noun in apposition, is affectionately dedicated to Linda Ann Hollenberg, collecting companion and dear but elusive friend. The name has the same stem as the Spanish word *lindo* that means pretty which accurately describes both the wasp and Ms. Hollenberg.

Discussion.—The black body and amber wings of *linda* easily set the species

apart from all other West Indian *Pachodynerus*. Morphologically the species is probably closest to *cinerascens*, but the latter has a transverse carina on tergum I, and the punctation of I-II is close with the interspaces roughened. The wings of *cinerascens* are violaceous. Possibly *P. linda* is endemic to Mayaguana although I have seen no *Pachodynerus* from nearby Caicos or Acklins Is.

KEY TO WEST INDIAN *PACHODYNERUS*

- 1. Tergum I entirely black 2
- Tergum I with yellow apical band 5
- 2. Terga II–V or VI yellow banded apically; pronotum margined with yellow; metanotum yellow banded, upper propodeal lamella yellow, legs with yellow stripes; sternum II flat; ocellar triangle longitudinally channeled; (Cuba, Isle of Pines, Grand Cayman, Jamaica, Hispaniola, Puerto Rico, St. Thomas, New Providence I., San Salvador I., Dominica, Trinidad) *nasidens* (Latreille)
- Thorax, legs and gaster without yellow; sternum II transversely depressed near base (concave in lateral profile); ocellar triangle flat 3
- 3. Tergum I without transverse carina at top of basal declivity; tergum II dull, sparsely, weakly punctate except along hindmargin; wing veins and membrane amber (Mayaguana I.) *linda* Menke, n. sp.
- Tergum I with transverse carina; tergum II moderately to strongly shining, covered with obvious punctation; wing veins dark brown or black, membrane smoky or violaceous at least along front margin 4
- 4. Posterolateral process of propodeum sharp apically, thornlike; scutum and scutellum smooth, shiny, with shallow punctures separated by 1–2 diameters; tergum II smooth, shiny, sparsely, shallowly punctate; male clypeus yellow at least in middle (Puerto Rico, Vieques I., St. Thomas, St. John, Guana I., Virgin Gorda, St. Martin, Anegada, Saba, St. Eustatius, St. Kitts, Barbuda, Montserrat) *atratus* (Fabricius)
- Propodeal process bluntly rounded apically; scutum and scutellum deeply, coarsely, nearly contiguously punctate, interspaces weakly shining; tergum II dull, densely, shallowly punctatorugose; male clypeus black (St. Croix, St. Thomas) *cinerascens* (Fabricius)
- 5. Legs black with yellow maculations 6
- Legs reddish brown and yellow, or largely reddish brown (coxae sometimes black) 9
- 6. Pronotal dorsum margined by yellow anteriorly and posteriorly, or completely yellow and gena all black; propodeal lamella not forming a posterolateral angle or toothlike process; a downward projecting fingerlike process (often yellowish) associated with mesopleural scrobe (Antigua, Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, Barbados, St. Vincent, Canouan I., Grenada) *guadulpensis* (Saussure)
- Pronotum yellow margined only anteriorly*; gena sometimes with yellow spot; propodeal lamella forming a posterolateral toothlike process or angle; mesopleuron merely angular adjacent to scrobe, without long process 7

* If narrowly margined by yellow posteriorly (Great Inagua I.) then gena has yellow spot.

7. Inner margins of ocelli surmounted by swellings, hindocelli sunken, interocellar area usually longitudinally channel-like; gena with yellow spot (Cuba) *alayi* Bequaert
- Inner margins of ocelli not surmounted by integument, ocelli not sunken, interocellar area flat; gena all black or with yellow spot (Hispaniola, Mona I., Great Inagua I.) *tibialis* (Saussure) 8
8. Gena and female ocular sinus all black; yellow bands on terga I–II and sternum II essentially uniform in width (Hispaniola, Mona I.) .. *tibialis* s. s.
- Gena with elongate yellow spot; female ocular sinus partly yellow; yellow bands on terga I–II and sternum II abruptly expanded laterally to at least twice width of band at midline (Great Inagua I.) *tibialis* subsp. *barbouri* Bequaert
9. Tergum I with coarse punctures in black area; propodeal hindface covered with coarse, crescentic ridges (Jamaica) *jamaicensis* Bequaert and Salt
- Tergum I impunctate in black area or at most with sparse, shallow punctures; propodeal hindface at most with few, fine crescentic ridges near petiole socket, unridged dorsad (Cuba, Cayman Is., Bahamas) 10
10. Tergum I with very shallow, sparse punctures basad of yellow band at least laterally; gena largely yellow or with elongate yellow spot; tergum I black* with yellow band (Cuba, Bahamas) *scrupeus* (Zavattari)
- Tergum I impunctate basad of yellow band; gena completely black or if with small yellow spot (Bahamas) then tergum I tricolored (largely reddish brown except for apical yellow band with narrow black zone preceding it) (Cuba, Cayman Is., Bahamas) *cupensis* (Saussure) 11
11. Tergum I tricolored (reddish brown, black and yellow), terga III–VI or VII black (Bahamas) *cupensis* subsp. *bahamensis* Bequaert and Salt
- Tergum I bicolored (black and yellow), tergum III apically, IV–VI or VII completely reddish brown (Cuba, Cayman Is.) 12
12. Scutellum with two large yellow spots; yellow bands of terga I–II similar in width (Cuba, Little Cayman I.) *cupensis* (Saussure) s.s.
- Scutellum black or with two tiny yellow spots (= to one or two ocellus diameters); tergum II without yellow band or at most with band that is much narrower than that on I (Grand Cayman I.) *cupensis* subsp. *caymanensis* Soika

Genus *Pachodynerus* Saussure

Among the 10 West Indian species of this genus that I recognize, three were not mentioned by Bequaert (1948) in his review of Caribbean *Pachodynerus*. They were *atratus* (Fabricius), *cinerascens* (Fabricius) and the new species, *linda*. The first two are unusual in that they have a transverse carina on tergum I, and Bequaert (1929) earlier assigned them to *Monobiella*, which he regarded as a subgenus of *Pachodynerus*. His omission of these two species in his 1948 paper may indicate that by that time he regarded *Monobiella* as a distinct genus.

Ashmead (1900) established *Monobiella* for *atratus*, and later (Ashmead, 1902) indicated that the species had five segmented maxillary palpi. However, as Za-

* Vertical slope of tergum I rarely reddish brown in some specimens from New Providence I., Bahamas.

vattari (1912) correctly stated, the palpi of *atratus* have the usual six segments. That leaves only the tergal carina as a possible generic character for *Monobiella*. Carpenter and Cumming (1985), in their fine discussion of character states in the Eumeninae, pointed out the variable nature of the tergal carina in the subfamily, and stated that it has been given too much weight as a generic character. I concur. The tergal carina of *cinerascens* is weaker than in *atratus*, and based on other morphology the two species are probably not closely related. In other species of *Pachodynerus* tergum I is somewhat angulate at the top of its vertical face (*jamaicensis*, *linda*, *tibialis*). Thus the tergal carina is suspect as a generic (or subgeneric) character and I am synonymizing *Monobiella* with *Pachodynerus* (NEW SYNONYMY).

***Pachodynerus alayoi* Bequaert**

Pachodynerus alayoi Bequaert, 1948. Psyche 55:110. Holotype ♂, Siboney, Cuba (MCZ).

This wasp is apparently a Cuban endemic. The black legs with yellow on the femora, tibiae, and tarsi, separate *alayoi* from *cubensis* and *scrupeus*, two of the three other Cuban species. The legs are reddish with yellow markings in *cubensis* and *scrupeus*. The gena has an elongate yellow maculation as in *scrupeus*. The yellow band on tergum I separates *alayoi* from *nasidens*, the remaining species known to occur in Cuba. Tergum I is entirely black in *nasidens*.

Bequaert (1948) stressed that the upper propodeal lamella (or carina) is "poorly developed, low, and irregular, not forming a complete lamella," but in the female and two males available to me, it is continuous from the posterolateral angle nearly to the metanotum. In one male and the female, the carina is low, its crest undulating, similar in this respect to some Bahamian specimens of *scrupeus*. Overall the lamella is not as high as in most species of *Pachodynerus*, and Jim Carpenter (in litt.), after examining Bequaert's type, says that it is very low, indistinguishable from the adjacent propodeal rugae. Obviously more material of *alayoi* is needed to determine the extent of variation in this species.

***Pachodynerus atratus* (Fabricius)**

Vespa atrata Fabricius, 1798. Suppl. Entomol. Syst., p. 262. Five syntypes, ♂, ♀, "Americae meridionalis insulis" Dom. Lund [type locality here restricted to St. Thomas] (Mus. Copenhagen). One male selected and labeled as lectotype (present designation).

Rhynchium atratum, Dewitz, 1881. Berl. Entomol. Z. 25: 200. Listed from Puerto Rico.

Monobiella atrata, Ashmead, 1900. Trans. Entomol. Soc. Lond. 1900: 312. Listed from Puerto Rico.

Odynerus atratus, Zavattari, 1912. Arch. Nat. 78A: 192. Redescribed, listed from Puerto Rico and St. Thomas.

Vespa atrata, Schulz, 1912. Berl. Entomol. Z. 57: 82. Notes on types, cites St. Thomas as a locality.

Monobiella atrata, Wolcott, 1924. J. Dept. Agric. Porto Rico 7: 41. Listed from Puerto Rico.

Pachodynerus atratus, Bequaert, 1929. Ann. Entomol. Soc. Am. 22: 558. First assignment to *Pachodynerus*.

- Monobiella atrata*, Wolcott, 1936. J. Agric. Univ. Puerto Rico 20: 568. Listed from Puerto Rico.
- Pachodynerus* (sic) *atratus*, Wolcott, 1941. J. Agric. Univ. Puerto Rico 25: 156. Listed from Puerto Rico.
- Pachodynerus atratus*, Wolcott, 1951. J. Agric. Univ. Puerto Rico 32: 861. Listed from Puerto Rico.
- Pachodynerus atratus*, Simonthomas, 1984. Stud. Fauna Curacao Caribbean Is. 67: 94. Recorded from St. Martin, Saba, Montserrat, and St. Kitts.

This is a distinctive species. The body is entirely black (except for the yellow male clypeus and stripe sometimes on the scape), and the integument is shiny. Unlike most *Pachodynerus*, *atratus* is rather sparsely, shallowly punctate. The propodeum has a downward projecting, thornlike posterolateral process (reduced in occasional specimens), and usually there is no carina or lamella between it and the metanotum (occasional specimens have a partial carina). In one of Fabricius' syntypes, as well as the two males from Barbuda that I have seen, the propodeal process is merely angulate or rounded off. Among West Indian species of the genus, the absence of the propodeal carina or lamella is shared only with *cinerascens*, although some specimens of that species have a weak carina. The strong transverse carina on tergum I is also distinctive, although *cinerascens* has a weak one. The hypoepimeron projects ventrad over the scrobe as an acute point in *atratus*, but not in *cinerascens*. Although *atratus* has some features that isolate it from other species of *Pachodynerus*, none warrant placing it in a separate genus or subgenus in my opinion.

Schulz (1912) studied Fabricius' syntypes and my examination of them confirms that his interpretation of *atratus* was correct. The Sehestedt and Tonder Lund Collection in Copenhagen contains two males. The one in the best condition bears a handwritten label "V. atrata ♂" that Ole Lomholdt says was from the pen of either Sehestedt or Lund. Three additional specimens, one male and two females, are present in the Kiel University Collection now housed in Copenhagen. One female has a handwritten label "atrata" whose reverse side reads "V. ex Ins. S. Thomae." Since Fabricius specifically mentions "Dom. Lund" in the original description, I am selecting one of the S. and T. Lund males as lectotype, and have so labeled it. It is the male without the handwritten label. J. van der Vecht placed a lectotype label on this specimen in 1963, but never published it. Although it is missing all but tergum I of the gaster and the antennae past flagellomere I, the propodeal processes are well formed and typical for the species. The other male, although much more intact, has poorly formed propodeal processes, and for that reason I have decided not to use it for the lectotype. Based on the locality data associated with the female in the Kiel Collection I hereby restrict the type locality of *atratus* to St. Thomas.

Pachodynerus atratus occurs from Puerto Rico to Montserrat in the northern Leeward Islands. The clypeus is entirely yellow in males from Barbuda, but those from Puerto Rico, St. Thomas and Montserrat only have a yellow zone down the middle third of the clypeus. The clypeus of Fabricius' males is similarly colored. The male scape varies from all black to black with a yellow stripe on its outer (lower) face. The stripe is best developed on material from Barbuda. Miskimen and Bond (1970) list *atratus* from St. Croix, but I cannot confirm this and suspect a misidentification. There are two females of *atratus* in the Museum of Compar-

ative Zoology labeled Barbados, but this is far from the rest of the species' range and an error in labeling is probable.

***Pachodynerus cinerascens* (Fabricius)**

Vespa cinerascens Fabricius, 1775. Syst. Entomol., p. 369. Two syntypes, ♀, "America" v. Rohr. [type locality here restricted to St. Croix] (Mus. Copenhagen). Lectotype hereby designated.

Odynerus cinerascens, Zavattari, 1912. Arhiv Naturges. 78A: 221. Redescribes species based on material in Berlin Museum labelled "America."

Rhynchium cinerascens, Schulz, 1912. Berl. Entomol. Z. 57: 82. Studied Fabricius' types.

Pachodynerus cinerascens, Bequaert, 1929. Ann. Entomol. Soc. Am. 22: 558. First assignment to *Pachodynerus*.

Pachodynerus (sic) *cinerascens*, Beatty, 1944. J. Agric. Univ. Puerto Rico 28: 171. First clear record from St. Croix. Nesting in limestone cliffs.

Pachodynerus cinerascens, Miskimen and Bond, 1970. N. Y. Acad. Sci., Sci. Surv. Porto Rico Virgin Is. 13: 110. Recorded from St. Croix.

Being wholly black with violaceous wings, this wasp is unlikely to be confused with any other West Indian *Pachodynerus* except *atratus*. The key characters make identification straightforward.

Two syntypes are housed in the Kiel University Collection now housed in Copenhagen. One bears Fabricius' handwritten label "cinerascens." J. van der Vecht placed a lectotype label on this female in Aug. 1959, but never published it. This is the specimen that I have chosen as lectotype, and it is so labeled. The tergal carina is weak in both specimens, but otherwise they agree with other material available to me.

Fabricius' material was collected by von Rohr. According to Zimsen (1964), von Rohr collected insects in the West Indies, and established a botanic garden in St. Croix in the Virgin Islands. Nearly all material seen by me is from St. Croix, and I hereby restrict the type locality to that island. The species also occurs on St. Thomas (Montana State University).

***Pachodynerus cubensis* (Saussure)**

Odynerus cubensis Saussure, [1853]. Etudes sur la Famille des Vespides. 1: 181, pl. 18, fig. 8. Syntypes, ♂, ♀, Cuba (Mus. Paris, Mus. Genoa). Lectotype ♀, "Cuba", present designation (Mus. Paris).

Pachodynerus scrupeus var. *bahamensis* Bequaert and Salt, 1931. Ann. Entomol. Soc. Am. 24: 786. Holotype ♀, Mangrove Cay, Andros I., Bahamas (Museum of Comparative Zoology). NEW STATUS.

Pachodynerus scrupeus var. *bahamensis*, Bequaert, 1948. Psyche 55: 112. Description of male, distribution.

Pachodynerus scrupeus var. *bahamensis*, Krombein, 1953. Am. Mus. Novit. (1633): 8. Distribution.

Pachodynerus cubensis ssp. *caymanensis* Soika, 1969. Mem. Soc. Entomol. Ital. 48: 384. Holotype ♀, Rum Point, Grand Cayman (BMNH).

Pachodynerus scrupeus var. *bahamensis*, Elliott et al., 1979. Proc. Entomol. Soc. Wash. 81: 355. Synonymizes *bahamensis* with *scrupeus*.

I have examined two female syntypes of *cubensis* from the Paris Museum and confirm that Zavattari's (1912) interpretation of this species, which was based on Saussure's color figure on plate 18, was correct. One specimen bears a handwritten label "Cuba," and also a lectotype label placed on it by R. M. Bohart in 1960. The latter has never been established in print. I have selected this specimen as lectotype and placed a label on it.

Pachodynerus cubensis is very similar to *scrupeus*, the other red and yellow legged *Pachodynerus* found in Cuba. However, the tergal differences in the key seem to separate them consistently. In Cuba seemingly reliable color differences separate the two species also, but in the Bahamas where they occur sympatrically, the color patterns are less diagnostic. Typical *cubensis* has a completely black gena, the scutellum has two large but discrete yellow spots, and tergum I has a narrow, parallel sided yellow band whose width is not more than one third the dorsal midlength of the plate. This band usually expands abruptly as it turns downward laterally. Sternum I is usually reddish brown or black (yellow in one female seen). The female clypeus usually has a linear black spot near its apex and is narrowly black laterally along the margin. The ocular sinus of the frons is nearly always completely black in females from Cuba (one out of five specimens from Havana in USNM has yellow in the sinus). Males of *cubensis* agree with both sexes of *scrupeus* in apparently always having a yellow macula in the ocular sinus. Gastral segments III-VI or VII are reddish brown (only apically on III) in *cubensis*. The hindfemur is largely brownish or blackish in occasional females from Cuba.

In Cuba *P. scrupeus* has an elongate yellow macula on the gena (the gena is often largely yellow), the scutellum has a single transverse yellow spot, tergum I has a broader, more irregular yellow band, and sternum I is yellow. The female clypeus lacks the linear mesal black spot in the few specimens available to me. Although *scrupeus* usually has a reddish brown gastral tip, segment III is usually black and occasional specimens have the remaining terga dark also.

There seem to be few morphological differences between *cubensis* and *scrupeus*, and none are particularly striking. In *cubensis* the black horizontal part of tergum I is impunctate, while in *scrupeus* large, shallow, sparse punctures are visible. Tergum I in *cubensis* is vaguely angular at the interface between the vertical and horizontal faces. In *scrupeus* this area is simply rounded. The upper propodeal lamella is uniformly high in *cubensis*, but it is sometimes low and irregular in *scrupeus*. Interestingly, the humeral carina, a generic character for *Pachodynerus*, is often weak in males of both species, and is evanescent in one specimen of *P. cubensis bahamensis*.

Pachodynerus cubensis is unrecorded from the Bahamas, but the taxon *bahamensis*, described by Bequaert and Salt (1931) as a variety of *scrupeus*, appears to me to be more properly assignable to this species (NEW STATUS). This opinion is based on tergum I which is impunctate like that of *cubensis* and has the same vague angulation at the crest. The propodeal lamella is distinct but lower than in Cuban material of *cubensis*. The color pattern tends to corroborate the transfer of *bahamensis* from *scrupeus* to *cubensis*, and subspecific rank seems justified based on the distinctive tricolored abdomen. Elliott et al. (1979) synonymized *bahamensis* under *scrupeus* based on material of both collected on San Salvador I. My examination of their material indicates that two species are present and that their synonymy was erroneous.

I have seen *bahamensis* from the following islands: South Bimini, New Providence, Eleuthera, San Salvador, Rum Cay, and Long Island. Bequaert's type is from Andros. Color in *P. cubensis bahamensis* differs from Cuban specimens in the following ways: tergum I is almost entirely reddish brown except for the apical yellow band and a narrow black area immediately in front of it, and III–VI or VII are all black. In a female (FDA) from Eleuthera (Rainbow Bay) most of the vertical slope of tergum I is black. The usual reddish brown color is reduced to a zone at the crest with downward extensions laterally. Accompanying males are typically colored.

There is color pattern variation from island to island and even within an island population in *bahamensis*. The middle and lateral black areas of the female clypeus are united forming a W in one of two specimens from Long I., and in two of six specimens from San Salvador. The apical half of the clypeus is black in the single female seen from New Providence I., and in the two from South Bimini. The gena of the two Long I. females has a yellow spot that is smaller than an ocellus, and in the single Rum Cay female seen it is larger and elongate, but smaller than the similar maculations found in *scrupeus*. The female ocular sinus has a yellow spot in the Rum Cay specimen and in one of the Long I. specimens.

Pachodynerus cubensis also occurs in the Cayman Islands (Grand Cayman and Little Cayman—USNM). The female color pattern on material from Grand Cayman, the farthest island from Cuba, is atypical: the lower one half to two thirds of the clypeus is black, the ocular sinus is partly yellow, the yellow spots on the scutellum are tiny, varying from one to two ocellus diameters in size, and tergum II lacks an apical yellow band or it is very narrow. Females from Little Cayman have the typical narrow black spot on the lower middle of the clypeus, the ocular sinus is black, the scutellum has the typical large yellow spots, and tergum II has a broad yellow band. Males from Grand Cayman vary. Five of the seven specimens available have a broad yellow band on tergum II as in typical *cubensis*, the other two have a very narrow one. The yellow scutellar spots are very tiny as in the female, or are absent. No males are available from Little Cayman. Soika (1969) described the Grand Cayman population as a subspecies, *caymensis*, and recognition of this taxon seems justified.

Pachodynerus guadulpensis (Saussure)

Odynerus guadulpensis Saussure, [1853]. Études sur la Famille des Vespides. 1: 182. Type ♀, "La Guadeloupe" (Mus. Paris).

Odynerus sanctivinceni Ashmead, 1900. Trans. Entomol. Soc. Lond. 1900: 233. Lectotype ♀, Kingstown, St. Vincent (USNM), present designation.

Odynerus grenadensis Ashmead, 1900. Trans. Entomol. Soc. Lond. 1900: 234. Lectotype ♀, St. Georges, Grenada (USNM), present designation.

Odynerus guadelupensis Dalla Torre, 1904. Genera Insectorum, Fasc. 19, Vespidae, p. 46, lapsus or emendation.

Pachodynerus guadulpensis sanctivinceni Willink, 1972. Proc. Kon. Nederl. Akad. Wet. (C)75: 71. Lapsus.

Pachodynerus guadulpensis occurs from Antigua and Montserrat to Grenada in the Lesser Antilles, and is recorded from many of the intervening islands. The

yellow margins of the pronotal dorsum combined with the yellow apical band on tergum I immediately identify the species.

There is considerable interisland color variation in *guadulpensis* and not all of it is clinal. The pronotal dorsum is entirely yellow in material from Guadeloupe, Martinique, St. Lucia, St. Vincent and Canouan I. It is nearly all yellow in specimens from Barbados and Grenada (I have not seen material from Antigua and Montserrat), but in material from Dominica there is a large black zone laterally. Only terga I–II have yellow bands in material from Guadeloupe, Dominica and Grenada. Tergum III has a narrow yellow band in females from Martinique, St. Lucia and Canouan I. (males from Martinique have narrow bands on III–IV). All terga are banded in material from St. Vincent, and tergum II often has a lateral yellow spot in females. The sterna also vary in the amount of yellow banding but it is mainly in the degree of band width. Generally all sterna, except I, have bands except in specimens from Dominica. On this island some males only have a yellow band on sternum II, or on II–III. Southward there is a reduction in the amount of black on the female clypeus. It is all yellow in the single specimen from Canouan I., and in all females from St. Vincent. However, the female clypeus has a large black zone in material from Grenada, an island south of St. Vincent.

Bequaert (1948) treated the St. Vincent population as the "variety" *sanctivincenti* (Ashmead) because of its extensive yellow maculations (scutellar spots very large, nearly fused; yellow band of tergum I enlarged laterally, tergum II sometimes with yellow spots, terga III–VI yellow banded, female clypeus entirely yellow, etc.). Willink (1972) apparently regarded *sanctivincenti* as a subspecies, but in view of the variety of island color forms in *guadulpensis* I feel that such recognition is premature. Long series of specimens from all of the islands within the range of *guadulpensis* should be analyzed before making a decision on subspecies recognition.

Bequaert (1948) and Willink (1972) synonymized *grenadensis* (Ashmead) with *guadulpensis* and I concur. Types of this name, as well as *sanctivincenti*, are housed in the British Museum (Natural History) and the National Museum of Natural History (USNM). I have selected lectotypes for these two names from the USNM material.

The USNM Collection contains a series of wasps from Trinidad that are similar structurally to *guadulpensis*, but their color pattern and setation are different. Presumably the material Callan (1954) mentioned from Trinidad under the name "*Odynerus* sp. near *grenadensis* Ashmead" is the same. All of the terga (except VI in the female) and sterna (except I) are yellow banded or maculated similar to *guadulpensis* from St. Vincent, but the pronotal dorsum is black laterally, the scutellum only has two small yellow spots, and the female clypeus is largely black. The head and thoracic dorsum are fairly densely covered by golden, decumbent setae, as well as erect setae of the same color. The facial and thoracic hair of *guadulpensis* is generally darker and consists mostly of erect and somewhat sparser setae. Like *guadulpensis*, the Trinidad specimens have a yellowish projection over the scrobe, and the upper propodeal lamella does not form a posterolateral tooth or angle. These morphological features are also found in the South and Middle American species *praecox* (Saussure), the name that apparently should be used for the Trinidad species. However, typical *praecox* has yellow bands only on terga I–II, but in northern South America the species has the same extensive yellow banding found in the Trinidad specimens, and the same decumbent golden pu-

bescence. The name *zonatus* (Saussure), which Willink (1972) synonymized under *praecox*, applies to these extensively yellow banded specimens. Saussure (1875) suggested that his *zonatus* might be a "variety" of *guadulpensis*.

Further study may indicate that *praecox* is conspecific with *guadulpensis* as Zavattari (1912) suggested. The latter name has priority. However, there is one morphological feature in the males of the Trinidad material that casts doubt on this. Unlike *guadulpensis*, the apex of tergum I is depressed coinciding with the yellow band, and the punctures there tend to be very deep, contiguous, and their edges spiculate, at least in the middle of the plate. This condition also occurs in mainland *praecox* from Venezuela. In males of *guadulpensis*, the apex of tergum I is slightly depressed, but the punctation there is not abnormal.

Pachodynerus jamaicensis Bequaert and Salt

Pachodynerus jamaicensis Bequaert and Salt, 1931. Ann. Entomol. Soc. Am. 24: 787. Holotype ♂, Montego Bay, Jamaica (American Museum of Natural History).

The coarsely ridged propodeal hindface, the coarse punctures of tergum I, and the suggestion of a transverse ridge at the base of tergum I make *jamaicensis* one of the more distinctive West Indian species. The reddish brown legs and yellow bands on terga I–II are supplementary recognition features. The species is apparently endemic to Jamaica.

Pachodynerus nasidens (Latreille)

Odynerus nasidens Latreille, [1817]. Insectes de l'Amérique Equinoxiale . . . Humboldt et Bonpland, vol. 2, livr. 10, p. 112. ♀, origin unspecified (Museum Paris?).

Odynerus simplicicornis Saussure, [1855]. Études sur la Famille des Vespides, vol. 3, p. 253. ♂, Cuba (Mus. Paris). Synonymy by Zavattari, 1912; Bequaert, 1948; Willink, 1972.

Odynerus auratus Saussure, 1858. Rev. Mag. Zool. (2)10: 166. ♀, "Mexique." Type depository unknown. Synonymy by Saussure, 1875, Zavattari, 1912.

Odynerus nasidens var. *minor* Saussure, 1875. Smithson. Misc. Coll. 254: 233. Syntypes, ♂, ♀, Mexico (?). (Mus. Geneva ?). Synonymy by Bohart, 1951.

Odynerus magdalena Kriechbaumer, 1900. Berl. Entomol. Z. 45: 105. Type ♀, "Columbien: Puerto Berrio am R. Magdalena" (Mus. Munich).

Odynerus magdalena, Schulz, 1903. Berl. Entomol. Z. 48: 260. Synonymy with *nasidens*.

Odynerus clavilinus Cameron, 1912. Timehri, J. R. Agric. Soc. Brit. Guiana (3)2: 222. Syntypes, ♂, ♀, British Guiana (BMNH).

Odynerus clavilinus, Soika, 1941. Boll. Soc. Veneziana Stor. Nat. 2: 248. Synonymy with *nasidens* (♀ only); also misspelled *clavilineatus* on same page.

Odynerus clavilineatus (sic), Willink, 1972. Proc. Kon. Nederl. Akad. Wet. (C)75: 69. Synonymy with *nasidens* (♀ only).

This is the only yellow banded species in the West Indies with a completely black tergum I. Actually, a suffused band can often be seen laterally on tergum I under a microscope, but the plate appears black to the naked eye.

P. nasidens is widespread in the Neotropical Region and it is known from the Greater Antilles, some of the Bahamas, and also Trinidad. It seems to be replaced in the Lesser Antilles by *guadulpensis*. *P. nasidens* occurs as far north as Arizona,

Texas and southern Florida and may have been introduced to the last state. It has been introduced (records from specimens in USNM) to the Hawaiian Islands, the Marquesas, Christmas I., Canton I., Eniwetok Atoll, Kwajalein Atoll, and Guam.

Pachodynerus scrupeus (Zavattari)

Odynerus scrupeus Zavattari, 1912. Archiv Naturges. 78A: 220. Syntypes, ♂, ♀, Cuba (Mus. Turin, Mus. Berlin).

When Zavattari (1912) described *scrupeus* he stated that it was very similar to *cubensis*, but that there seemed to be constant color differences between them. My study of the two species confirms this, but some slight morphological differences can be added. In *scrupeus* tergum I has sparse, shallow (faint) punctuation in the black area of the plate, and the interface between the vertical and horizontal parts is rounded. In *cubensis* tergum I is impunctate basad of the yellow band and is vaguely angled at the crest. Unfortunately, *scrupeus* is infrequently collected in comparison with *cubensis*, at least in Cuba, so that the diagnostic reliability of these tergal features must be regarded as provisional.

In Cuba the color pattern of *scrupeus* is as follows: the gena is largely yellow, or at least has an elongate spot; the ocular sinus of the frons is yellow; the female clypeus is entirely yellow (always?); the scutellum has one large, rectangular yellow spot, this is obviously attributable to the fusion of the two square or triangular spots found in *cubensis*—thus when more material is available, some Cuban *scrupeus* may be found to have two discrete spots also. Tergum I has a broad irregular, yellow band whose width at the midline is at least equal to half the plate's length, and the inner margin of this band is undulating, its width expanding laterally. Sternum I is yellow. The gaster is usually reddish brown apically (segments IV–VI or VII) just as in *cubensis*, but unlike that species, segment III is usually entirely black. I have seen one male of *scrupeus* in which terga IV–VII are blackish (also noted by Bequaert, 1948).

Pachodynerus scrupeus is known from La Habana and Oriente Provinces in Cuba. It also occurs sympatrically with *cubensis* in the northern islands of the Bahamas. I have seen material from North and South Bimini, Gun Cay, Eleuthera, New Providence, Andros, Cat I., San Salvador, and Rum Cay. The propodeal lamella varies in the Bahamian material. In some specimens it is only a low carina and it often becomes evanescent toward the propodeal base.

The color pattern of the Bahamian populations varies on some of the islands and differs from Cuban *scrupeus*. Unlike Cuban material, the yellow band on tergum I is fairly uniform in width and is similar to the band on II. The thickness of the band on I is about a fourth to a third the median length of the dorsal part of the plate. Usually its inner border is not undulating or step-like, but the band broadens gradually laterad except in material from the Bimini group. The band of tergum I is narrowest in this last population. In one of three males seen from New Providence, the vertical slope of tergum I is reddish brown, but this color does not extend to the horizontal surface as in *P. cubensis bahamensis*. All Bahamian *scrupeus* have two discrete yellow scutellar spots. These are square or triangular as in *P. cubensis*. These spots are only about three ocellar diameters in size on some specimens from South Bimini. Sternum I varies from yellow to reddish brown or combinations of both. The female clypeus is entirely yellow

except in the Bimini group. Here there is a large irregular, central black spot, and the clypeal border near the apex is broadly lined by black. In one South Bimini female the median and lateral spots are fused. In one of two females seen from San Salvador (SUNY) there is a round, ocellar-size, median black spot on the clypeus. Gastral segments III–VII are black in Bahamian males except in one of three seen from New Providence. In this specimen tergum VII and sterna VI–VII are reddish brown. Bahamian females usually have the last segment or two reddish brown, but in a few only the last sternum is so colored.

The scutellar spots, the more or less regular yellow band on tergum I, and the largely black gastral apex could be used to defend naming the Bahamian *scrupens* as a new subspecies, but I feel that much more material is needed before such an analysis can be safely made.

***Pachodynerus tibialis* (Saussure)**

Odynerus tibialis Saussure, [1853]. Études sur la Famille des Vespides, vol. 1, p. 183. Holotype ♀, “La Colombie, Caracas,” Coll. Romand [type locality here restricted to Hispaniola] (Mus. Geneva).

Odynerus tibialis, Saussure, 1875. Smithson. Misc. Coll. 254: 241. Suggests that Hispaniola (“St. Domingo”) is the true provenance rather than Venezuela.

Pachodynerus tibialis var. *barbouri* Bequaert, 1948. Psyche 55: 109. Holotype ♀, Great Inagua, Bahamas (MCZ).

Pachodynerus tibialis, Bequaert, 1949. Bol. Entomol. Venezolana 7: 128. Says species is strictly Antillean.

Pachodynerus tibialis is one of a number of West Indian members of the genus that have yellow bands only on terga I–II, and sternum II. However, the black and yellow legs of *tibialis* separate it from all but *alayoï* and some *guadulpensis*. In *guadulpensis* the pronotal dorsum is yellow margined in front and behind, the upper propodeal lamella does not form a posterolateral tooth or angle, and a narrow process projects downward over the mesopleural scrobe. *P. tibialis* has yellow only anteriorly on the pronotum (except in subspecies *barbouri*, see below), the propodeal lamella forms an angle posterolaterally, and the mesopleuron is merely angular near the scrobe. In these last two features *tibialis* is similar to *alayoï*, but the latter is more extensively maculated with yellow. In *tibialis* s.s. the scutellum is usually entirely black, the gena is all black, the female ocular sinus is all black, the femora are all black, and the tibiae are yellow only on their outer surface. In *alayoï* the scutellum has two yellow spots, the gena has an elongate yellow spot, the female ocular sinus has a yellow spot, the front and midfemora have yellow zones and all tibiae are extensively yellow. Structural differences between *tibialis* and *alayoï* are not striking. The interocellar area is flat in *tibialis* but is usually channel-like in *alayoï*. The ocelli in the latter are sunken due to the raised integument around their inner margins. The propodeal lamella is evenly arcuate from the process to the propodeal base in *tibialis*, but it is straight for most of its length in *alayoï*. Tergum I in *tibialis* is somewhat angulate transversely at the top of the anterior vertical face (as in *cubensis*), while in *alayoï* the tergum is simply rounded. The angulate tergum of *tibialis* suggests a close relationship with *cubensis*. As in that species tergum I is impunctate.

I have studied Saussure’s apparent holotype female; his description does not suggest that he had more than one specimen. It is labelled “Carac.” and someone

has added a red "holotypus" label. Saussure's type conforms to the usual interpretation of *tibialis*. I have also seen the male from Haiti that Saussure (1875) subsequently described. He indicated in this later paper that his original female was probably mislabeled and that the species was an inhabitant of Hispaniola, not Venezuela. Typical *P. tibialis* is known only from Hispaniola and nearby Mona Island, and I hereby restrict the type locality to Hispaniola. Wolcott (1951) indicated that records of *tibialis* from Puerto Rico are erroneous. Some specimens from Mona I. have two very tiny yellow spots on the scutellum.

An extensively yellow maculated form of *P. tibialis* occurs on Great Inagua I. in the southern Bahamas. Bequaert (1948) described this as the "var. (or subsp.)" *barbouri*, and although still known only from a single female, the color pattern is so different from typical *tibialis* that I am recognizing it as a subspecies. Bequaert stated that the propodeal lamella of *barbouri* was "wavy, forming a broad upward curve midway between the lateral angle" and the metanotum. However, Bequaert's description of the lamella is misleading. It is abruptly angled midway, not "broadly curved." In most specimens of typical *tibialis* the lamella forms a broad, even curve from the tooth to the metanotum. Whether or not the angled lamella in the type of *barbouri* is the typical condition in this taxon, remains to be seen. If it is, then *barbouri* might be elevated to species as suggested by Bequaert, but on other structural grounds it seems conspecific with *tibialis*.

The female of *P. tibialis barbouri* differs from typical *tibialis* in having a completely yellow clypeus, a yellow stripe on the scape, yellow in the ocular sinus and a spot above the antennal sockets, an elongate yellow spot on the gena, a narrow yellow band along the hind margin of the pronotum (always ?), and two small yellow spots on the scutellum. The mesopleuron is largely yellow, and there is a round yellow spot on the propodeal side. Yellow on the propodeal dorsum extends broadly onto the hindface. The coxae and fore and midfemora have large yellow zones. Laterally the yellow bands on the gaster abruptly widen basad. The expansion on tergum I includes a fingerlike extension that is directed toward the midline. The expansion on tergum II is actually a narrowly discrete circular spot.

In contrast, typical *tibialis* is much darker. The clypeus is black on its apical one half or two thirds, and the scape, frons, and gena are entirely black. The pronotum is only yellow margined anteriorly, although some specimens show narrow traces of yellow posteriorly. The scutellum is usually black. The mesopleuron usually only has a tegula-sized yellow spot behind the pronotal lobe. Yellow is confined to the dorsum of the propodeum, and the coxae and femora are entirely black. The tergal and sternal bands are fairly uniform in thickness over their entire length.

The yellow genal spot of *barbouri* is suggestive of *scrupeus*, but the latter has extensive reddish brown coloration, a straight propodeal lamella, and punctuation in the black area of tergum I.

The narrowly yellow hindmargin of the pronotum in *barbouri* is similar to *guadulpensis*, but the latter has a fingerlike process over the mesopleural scrobe, and the propodeal lamella ends without forming a tooth or angle. It is possible that the degree of yellow maculation along the hindmargin of the pronotum varies in *barbouri*. This is suggested by the fact that a few females of typical *tibialis* show traces of yellow along the hindmargin.

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